

Shoe orthoses vary from a special cast to fit a deformed foot or appropriate wedges to relieve pressure to special plastic insoles that accommodate for pressure areas in neuropathy.

The upper extremity orthosis not only substitutes for weak or absent motor power but also maintains position so that adjacent joints can either be moved or given traction by special attachments. Again, the newer plastics have made these orthoses more effective and acceptable to users.

A patient who is temporarily or permanently disabled can be helped by a profusion of devices ranging from a longhandled shoehorn and stocking puller-on to pencil holders and knife-fork devices. There are many kinds of canes, crutches and walkers with varying types of supports for particular problems. Wheelchairs also come in a variety of sizes, shapes and features to accommodate special needs.

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Electrodiagnostic Evaluation of Carpal Tunnel Syndrome

CARPAL TUNNEL SYNDROME (CTS) is a clinical condition for which electrodiagnostic testing is commonly requested. Routine electrodiagnostic testing for CTS usually includes electromyography (EMG) of the involved extremity and recording the median nerve distal motor latency (DML), distal sensory latency (DSL) to the index finger and forearm conduction velocity. Unfortunately, these routine procedures are limited in their accuracy. EMG gives abnormal results in only 45 percent of cases of CTS, while median nerve DML is abnormal in 67 percent of cases and DSL is abnormal in 85 percent of CTS cases. Thus, at least 15 percent of cases with apparent clinical CTS will have normal electrical studies. Because of this high rate of false-negative findings on electrical studies a number of procedures have recently been proposed to improve electrodiagnostic accuracy in CTS.

As early as 1974 data were reported that showed that abnormal findings on DSL, the most sensitive single test, could be limited to a single digital branch of the median nerve in 10 percent of CTS cases. Recording of the DSL to multiple digits (not yet a routine procedure) is done using

the same measured distance from stimulating cathode to pick-up cathode for each digit. This technique may be useful in cases with a high probability of CTS on clinical grounds where there is a normal DSL to the index finger. It is especially indicated when there is disturbed sensation in a finger other than the index finger and the routine studies are normal.

Of great clinical interest are recent data that show a well-defined relationship between median and ulnar DML and DSL in the same and opposite hands. The difference in median nerve DML and DSL between opposite hands should not exceed 1 msec and 0.5 msec, respectively. Likewise, the difference between median and ulnar nerve DMLs and DSLs in the same or opposite hand should not exceed 1 msec and 0.5 msec, respectively. Differences in excess of the above values suggest dysfunction of the nerve with the longer latency if all latencies are within the normal range. Many cases of CTS can be identified by this technique when routine DML and DSL recordings are normal. Because CTS is bilateral in over 60 percent of patients, the use of the median-ulnar nerves latency difference seems the more reliable tool in diagnosis when the routine studies are reported in the normal range.

A recently reported addition to the median-ulnar nerves latency difference technique is comparison of the median and ulnar nerve DSL with the ring finger, which is usually innervated by both nerves. Patients with normal findings showed a difference of 0.5 msec or less, while patients with CTS showed a difference ranging between 1 and 2.1 msec (mean 1.46 msec).

Finally, techniques that evaluate the more discrete segments of the terminal median nerve are reported to be helpful in the diagnosis of CTS and especially in the differentiation between CTS and a distal neuropathy. One study compares conduction between the wrist-palm segment and the palm-digit segment of the nerve. Another study uses multiple stimulation sites at 1-cm increments and looks for a change in uniform latency with increasing distance. While both techniques are complicated, they may be valuable in difficult CTS cases. The study of multiple stimulation sites is especially useful in identifying a discrete site of abnormality in the carpal tunnel.

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Thrombolytic Therapy for Deep Venous Thrombosis and Pulmonary Embolism

A MAJOR PROBLEM associated with spinal cord injury is deep venous thrombosis (DVT) and its dreaded concomitant, pulmonary embolism (PE). These entities traditionally have been treated with intravenously administered heparin anticoagulation, followed by three to six months of anticoagulation with warfarin sodium taken orally.

Another promising treatment modality, thrombolytic therapy, is now available to clinicians. Anticoagulation therapy using heparin does not prevent recurrent attacks of deep venous thrombosis, improve hemodynamic disturbances associated with thrombosis or embolism, or prevent permanent impairment of the pulmonary vascular bed and venous valves. There is evidence that lysis of thrombi and emboli using streptokinase (SK) or urokinase (UK) followed by heparin anticoagulation can achieve all these goals. Both SK and UK are plasminogen activators; they convert inactive plasminogen to the active enzyme plasmin, which in turn dissolves fresh fibrin clots.

At a recent National Institutes of Health Consensus Development Conference, the following guidelines were set forth for the use of thrombolytic therapy. This therapy should be administered only in cases where benefits outweigh risks, such as in patients with proved, fresh (less than five days) proximal deep venous thrombosis, pulmonary embolism or both. Proper patient selection is mandatory because bleeding, the most critical side effect, occurs when there are hemostatic defects present before instituting therapy. Absolute contraindications include active internal bleeding, cerebrovascular accident within the previous two months or other active intracranial process. Major contraindications include recent surgical procedure (within the past seven to ten days) obstetric delivery, organ biopsy, previous puncture of noncompressible vessels, gastrointestinal bleeding, serious trauma or severe hypertension. Minor contraindications include recent (within the past seven to ten days) minor trauma,

high likelihood of left heart thrombus, bacterial endocarditis, hemostatic defects and patient's age being over 75 years.

Thrombolytic drugs are administered in a fixed loading dose, followed by a fixed maintenance dose for 24 hours. This is in turn followed by conventional therapy with heparin for seven to ten days, followed by warfarin (Coumadin, Panwarfin).

Bleeding can be minimized by limiting physical handling of the patient, discontinuing intramuscular and subcutaneous injections and substituting medications taken by mouth, minimizing needle punctures and compressing invaded vessels. When this regimen is followed, the incidence of major bleeding complications has been 5 percent.

Therapy is monitored by following activated partial thromboplastin time and prothrombin time to determine whether some degree of systemic fibrinolysis has been established. Monitoring is not used as a guide for altering drug dose.

If bleeding should occur, therapy is discontinued. This usually results in cessation of fibrinolysis, as these therapeutic agents have a short half-life. If bleeding continues, whole fresh blood, fresh frozen plasma or epsilon aminocaproic acid (Amicar) can be administered.

Fibrinolytic therapy is a promising development in the treatment of DVT and PE and may eventually become the initial form of therapy for these conditions.

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Diagnosing Pulmonary Embolism

DESPITE THE WIDESPREAD USE of low-dose heparin therapy as prophylaxis against deep vein thrombosis (DVT), that complication and its sequela, pulmonary embolism (PE), are relatively common in patients with spinal cord injury, head injury, stroke or major fractures. Patients at high risk for complications from anticoagulant therapy are those with (1) cerebral hemorrhage, (2) completed strokes within two months of onset, (3) recent head injury, (4) spinal cord injury with associated intracranial, intrathoracic or intra-abdominal injuries, (5) peptic ulcer disease or a bleeding diathesis or (6) prior compli-